CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

CLEANUP AND ABATEMENT ORDER NO. 6-98-20

**REQUIRING MOLYCORP, INC.;
TO CLEAN UP AND ABATE THE EFFECTS OF WASTE DISCHARGES
TO THE IVANPAH VALLEY (IVANPAH HYDROLOGIC UNIT)
FROM THE
NEW IVANPAH DISPOSAL PONDS**

San Bernardino County

The California Regional Water Quality Control Board, Lahontan Region (Regional Board), finds:

1. Discharger

Molycorp Inc. (Molycorp) operates a mining and milling operation at Mountain Pass, San Bernardino County, which recovers and produces various compounds/products containing lanthanide metals. For the purpose of this Cleanup and Abatement Order (Order) Molycorp Inc. (Molycorp) is referred to as the Discharger.

2. Facility

Wastewater generated by mine operations is transported 13 miles through a mostly underground and above-ground pipeline to the New Ivanpah Ivanpah Disposal Ponds, constructed in 1987.Prior to then, wastewater was disposed in the Old Ivanpah Disposal Ponds, located approximately 3 miles south of the New Ivanpah Disposal Ponds.The New Ivanpah Disposal Ponds are located on the Ivanpah (Dry) Lake Bed.They consist of a 100-acre oval shaped pond separated into two areas, known as the North (larger) and South (smaller) ponds.Compacted native soils were used to construct a liner for the ponds.For purposes of this Order the New Ivanpah Disposal Ponds are referred to as the Facility.

Wastewater discharged from the outfall pipeline is high in total dissolved solids (TDS).Over 95 percent of the TDS mass is due to the following dissolved constituents, listed in order of prevalence:chloride, sodium, calcium, strontium, sulfate and nitrate. The wastewater also contains concentrations of the following additional parameters above the background quality for ground waters in the area:barium, lead, gross alpha, gross beta, radium, thorium and uranium.Pipescale may be also discharged from the outfall pipeline, mainly during operations to clean the interior surface of the pipeline.The pipescale contains concentrations of the following parameters above background levels for soils in the area: strontium, barium, lead, gross alpha, gross beta, radium, thorium and uranium.

3. Location

The Facility is located in Sections 5, 8 & 9 T16N, R15E; SBB&M; San Bernardino County.The Discharger owns the land on which the Facility is located, which was patented from the US Department of the Interior, Bureau of Land Management (BLM). Molycorp has installed ten ground water monitoring wells at the Facility.Of these, two monitoring wells are located on Molycorp property and eight monitoring wells are located on land owned by the U.S. Government and administered by BLM.Ground water monitoring wells for

the facility are located in Sections 5, 6, 7, 8, 17, and 21, T16N, R15E, SBB&M.

4. Waste Discharge Requirements

The Facility is regulated by Waste Discharge Requirements (WDRs) prescribed in Board Order No. 6-90-41 (WDID No. 6B369003001), adopted on June 14, 1990. Board Order No. 6-90-41 incorporates the requirements for ground water monitoring and corrective action that are currently codified in Sections 20380 through 20435, Title 27, California Code of Regulations.Board Order No. 6-90-41 contains the following discharge specification I.B. 1. c.:

"The discharge of waste shall not cause … in the surface or ground waters … any presence of the following indicator parameters in concentrations that exceed water quality protection standards (background levels):

i) lead
ii) strontium
iii) nitrate nitrogen"

5. Impact to Water Quality

Data submitted in self monitoring reports submitted by the Discharger as shown in Table 1, attached, indicate the ground water beneath the Pond has been impacted by nitrates in violation of WDRs.Additionally, wastewater discharged to the Facility contains radionuclides in concentrations above background water quality.Wastewater percolates to ground water and threatens to cause pollution.

6. Pond Sediments

Analytical results for samples of sediments from the New Ivanpah Disposal Ponds collected by Regional Board staff and the Discharger, indicate that areas of the pond sediments exceed the toxicity criteria (1,000 mg/kg) for lead.These results are tabulated below.

Total Lead Concentration (mg/kg)

Location	Regional Board Staff Samples	Data from Molycorp SMRs
North Pond	2,700[1]	1,600
South Pond	1,500	1,600

7. History

a) Board Order No. 6-90-41, Provisions II.3 & 4 required the Discharger to notify the Regional Board within seven days of a statistically significant increase in any indicator parameter and propose, in writing a Verification Monitoring Program.

b) The Discharger submitted a report entitled *Hydraulic Assessment of Water Level Rise in Evaporation Ponds Monitoring Wells, dated December 14, 1992*.The water level rises were believed to result from pond water infiltrating down to the water table. Further investigation was recommended including a pump test, down hole temperature logs and additional wells.

c) In October 1994, the Discharger submitted information consisting of an evaluation monitoring program (EMP) work plan for the first phase of site investigation to assess the lateral and vertical extent of nitrate nitrogen contamination in ground water.The Phase I EMP tasks consisted of a subsurface thermal study which would generate data to aid in determining future ground water monitoring well locations.Molycorp does not have approval of its application which was submitted to BLM to access land to implement the study.The work proposed in the Phase I work plan was never implemented.Molycorp submitted a modification to the work plan to conduct a portion of the Phase I study on Molycorp owned land. Regional Board staff has approved the limited study.Additionally, Molycorp has not received approval of its application to access monitoring wells located on BLM administered lands.Molycorp is in violation of its WDRs for not sampling wells required in its self monitoring program.

d) On June 4, 1997, the Discharger submitted an investigation work plan to characterize sediments contained in the Facility.The work plan also contains a plan to remove specific wastes from the ponds.Comments from regulatory

[1] Samples collected February 21, 1997 of sediments located in the vicinity of the outfall pipeline point ofdischarge to the pond.

agencies were transmitted to the Discharger on September 3, 1997.The Discharger prepared a revised work plan, dated October 17, 1997, in response to regulatory agency comments.The revised work plan has not yet been approved by the regulatory agencies.

e) Ground water monitoring continues for water table elevation, NO_3, strontium (Sr), and lead (Pb) in addition to field parameters and gypsum moisture blocks.Molycorp currently does not have permission from the BLM to access some of the monitoring wells.

8. Geology

Geologic investigations in the Ivanpah Valley area indicate two clayey lenses exist at approximately 30 feet below ground surface.The upper lens occurs approximately from 10 feet to 22.5 feet below ground surface.The lower lens occurs from approximately 26 feet to 34 feet below ground surface.The permeability of native geologic material beneath the New Ivanpah Disposal Ponds ranges from 10^{-5} to 10^{-7} centimeters per second.

9. Hydrogeology

The naturally occurring depth to ground water beneath the Facility is approximately 70 to 80 feet below ground surface.The regional ground water flow direction is predominately northerly to northeasterly.Ground water flow direction beneath the ponds is affected by percolation from the Facility that has caused a mound of ground water beneath the ponds.

Natural ground water quality deteriorates toward the center of the Ivanpah playa.Total dissolved solids (TDS) concentrations range from 500 mg/l at the edges of the playa to 55,000 mg/l below the center of the playa.The background concentration of TDS measured from monitoring wells near the Facility range from 10,000 to 50,000 mg/l.

Molycorp's ground water production wells are located near the dry lake playa, between one and two miles upgradient of the Facility.Ground water from the peripheral alluvial fan deposits is of good quality and is obtained from depths of up to 800 feet below ground surface.The effects of these and other production wells located within the Ivanpah Valley, such as those located near Primm, Nevada, may influence ground water flow directions in the vicinity of Ivanpah dry lake.

10. Water Quality Control Plan (Basin Plan)

The Regional Board adopted a revised *Water Quality Control Plan for the Lahontan Region* (Basin Plan), on March 31, 1995.

11. Beneficial Uses

The beneficial uses of surface and ground waters of the Ivanpah Hydrologic Unit as set forth and defined in the Basin Plan are:

a) Municipal and Domestic Supply *(Ground Water)*
b) Agricultural Supply *(Ground Water)*
c) Industrial Service Supply *(Ground Water)*
d) Ground Water Recharge *(Ground Water)*
e) Water Contact Recreation *(Surface Water)*
f) Water Non-Contact Recreation *(Surface Water)*
g) Warm and Cold Freshwater Habitat *(Surface Water)*
h) Inland Saline Water Habitat *(Surface Water)*
i) Wildlife Habitat *(Surface Water)*
j) Water Quality Enhancement *(Surface Water)*
k) Flood Peak Attenuation/Flood Water Storage *(Surface Water)*

The Ivanpah lake bed surface is normally dry, however during significant rainfall events, water ponds on the surface of the lakebed.Certain ponded areas may contain surface water most of the year.During these times, the above-listed surface water beneficial uses apply. The ground waters directly underlying the New Ivanpah Disposal Ponds are not suitable for all of the above beneficial uses because of the high concentrations of TDS.

12. Water Quality Objectives

The Basin Plan contains the nondegradation water quality objective (WQO).That objective requires that the quality of waters be maintained unless appropriate findings have been made under the State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California", which was adopted on October 28, 1968.

For the purposes of this Cleanup and Abatement Order, naturally occurring background water quality is referred to as the Background WQO, which is also referred to as the Non-Degradation WQO.The Basin Plan establishes cleanup standards for Waters of the State at the Background WQO.A discharger may submit a request for a ground water cleanup standard greater than the Background WQO but not to exceed the Upper WQO.The Regional Board reviews information submitted by a discharger to support such requests.Based on this information and information provided by other interested parties, the Regional Board determines whether a request can be approved; and if it can be approved, the basis on which approval can be granted.At the present time, the Discharger has not submitted such a request.

The Basin Plan contains a WQO for radioactivity, which states:

> "Radionuclides shall not be present in concentrations which are deleterious to human, plant, animal, or aquatic life nor which result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life."

13. Violation of Waste Discharge Requirements

Data contained in SMRs submitted by the Discharger indicate the Discharger violated, and continues to violate, Waste Discharge Requirements contained in Board Order No. 6-90-41.

14. Reasons for Action

Wastewater discharged to the New Ivanpah Disposal Ponds is percolating to the underlying ground water.Molycorp has discharged waste into waters of the State and threatens to create a condition of pollution.The extent of the plume is not defined. Ground water has been impacted by nitrate above background and may be impacted by radionuclides.The continued migration of the plume creates a threatened condition of pollution and/or nuisance.

15. Section 13304

CWC §13304 states, in part: "Any person who has discharged or discharges waste into waters of this state in violation of any waste discharge requirement or other order or prohibition of a regional board.... or who has caused or permitted ... or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the State and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the Regional Board cleanup such waste or abate the effects thereof or, in case of threatened pollution or nuisance, take other necessary remedial action.."

16. California Environmental Quality Act

This enforcement action is being taken by this regulatory agency to enforce provisions of the California Water Code and, as such, is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) in accordance with Section 15321, Chapter 3, Title 14, California Code of Regulations (CCR).

IT IS HEREBY ORDERED that, pursuant to CWC §13267 and §13304, the Discharger shall:

1. Refrain forthwith from discharging wastes from conveyance facilities (e.g., pipelines) to areas other than authorized disposal sites as described in Board Order Nos. 6-90-41.

2. Refrain forthwith and in accordance with the schedule below, from discharging wastes that exceed the characteristic of toxicity or that create a condition in the disposal pond that exceed the characteristic of toxicity as defined in 22 CCR §66261.24.

3. In accordance with the schedule below, implement a Ground Water Monitoring and Response Program as required by Article 5, Chapter 15 (currently re-codified in 27 CCR §20380 through 20435) that:

   a) will contain the plume boundary and thereby cease violations and threatened violations of Basin Plan WQOs for downgradient ground waters, and

   b) will cleanup and abate the effects of pollutants in ground water that are present at concentrations violating Basin Plan WQOs.

4. By **May 15, 1998** submit a work plan to survey the pipeline for potential leaks and investigate the area along the pipeline route for potential release locations.The work plan shall include research to identify possible activities that may have caused a release of waste and investigation of these areas, such as maintenance areas.These plans shall be coordinated with similar plans developed or being developed in response to the Radiologic Health Branch of the California Department of Health Services, San Bernardino County Fire Department Hazardous Materials Branch and other appropriate agencies.

5. By **June 1, 1998**, submit to the Regional Board a **Draft Site Investigation Workplan** to conduct an investigation to determine the characteristics, and vertical and areal extent of the degraded ground water plume beneath and in the vicinity of the site.The following shall be included:

   a) An **Evaluation of Design and Construction for Existing Monitoring Wells** to determine if any wells are or may be acting as vertical conduits for transporting either surface water or pollutants.(Include conclusions and recommendations for each existing well, including recommendations for wells that need to be destroyed.)

   b) A **Field Workplan** showing maps and design plans describing the proposed number, locations and designs of ground water monitoring points.The proposed monitoring points shall be sufficient to locate the following boundaries:

      i) Background WQO Boundary, which is defined for the purpose of this Order as the boundary surrounding the ground water monitoring points where one or more Background WQO is exceeded.

      ii) Upper WQO Boundary, which is defined as the boundary surrounding the monitoring points where one or more Upper WQO listed in the attached Table 1 is exceeded.

      iii) Isoconcentration boundaries for each of the Upper WQOs are listed in the

attached Table 1.

c) A **Health and Safety Plan**.

d) A **Sampling and Analysis Plan** including field and laboratory methods for all Constituents of Concern and laboratory Quality Control/Quality Assurance.

e) An **Investigation Derived Waste Disposal Plan**.

f) Any proposals for **interim corrective action**.

6. By **July 1, 1998**, submit a copy to the Regional Board of any complete **Application(s) for Land Access** that were sent to landowners to request permission to conduct site investigation required for compliance with this Cleanup and Abatement Order.

7. By **August 15, 1998**, submit a **Final Site Investigation Workplan**, including the information described in item 5a) through f), above, and addressing comments received on the Draft Site Investigation Workplan.

8. By, **30 days after approval**, Molycorp shall implement the **Remedial Action Plan** (RAP) submitted in compliance with Cleanup and Abatement Order No. 6-97-66.

9. By **October 1, 1998, or an alternate date approved by the Executive Officer**, Molycorp shall submit a completion report for implementation of the RAP for the New Ivanpah Disposal Ponds.The complete report shall include:(1) a description of work performed; (2) description of methods for collection, analysis and handling of samples; (3) tabulated analytical results; (4) copies of field logs and notes; (5) maps of appropriate scale of sample locations and results; (6) waste classification and disposal locations; (7) recommendations for any necessary follow-up activities; and (8) other relevant information.

10. By **October 1, 1998**, implement the **Site Investigation Workplan**.

By **February 1, 1999**, submit to the Regional Board a **Site Investigation Report** describing the investigation results. The following shall be included:

a) A description of work performed, tabulated analytical results, well logs, copies of laboratory reports, waste classification and disposal locations for drill fluids, and other relevant information.

b) Plan-view and cross-sectional-view maps, which include:

i) the Background and Upper WQO Boundaries, and isoconcentration boundaries described in Order No. 2.b., above;
ii) areas up to 2.0 miles beyond the boundary of affected ground water;
iii) ground water table equipotential contour lines;
iv) property boundaries;

v) boundaries of US Geologic Survey sections, townships and ranges;
vi) buildings, dwellings, and other significant structures; and
vii) locations of existing monitoring and water supply wells (both active and inactive), including ownership of the land on which the wells are constructed.

11. By **February 1, 1999**, submit to the Regional Board a **Feasibility Study Report** evaluating appropriate Ground Water Corrective Action alternatives that includes, but is not limited to:

a) results of mathematical modeling including cleanup time estimates and projections for any proposal to allow plume boundaries to migrate,
b) cost evaluations, and
c) the Discharger's recommended cleanup alternative.

12. By **March 15, 1999**, the Discharger shall submit a **Revised Report of Waste Discharge** for revision of Waste Discharge Requirements, including the following:

a) A report containing a revised **Water Quality Monitoring and Response Program** complying with the requirements of 27 CCR ∋20380 through 20430, which includes a **Ground Water Corrective Action Program** proposal.

b) A revised **Closure and Post-Closure Maintenance Plan** complying with 27 CCR ∋ 21400.

c) A revised **Instrument of Financial Assurance** adequate to cover the costs of Closure, Post-Closure Maintenance and all Known and Reasonable Foreseeable Releases for the entire Facility.

d) A **Cleanup Level/Degradation Analysis Application** to the Regional Board for any proposed cleanup standards greater than background or proposals to allow plume boundary migration, in the event the Discharger's recommended alternative involves such proposals.

e) **Time Schedule** for implementing the Ground Water Corrective Action Program.

13. Within **30 days following approval** of the Feasibility Study Report, implement an acceptable Ground Water Corrective Action Program.

14. All work plans and technical reports are to be reviewed and signed by a California Registered Geologist, Civil Engineer, or Certified Engineering Geologist.Additionally, all of the field activities are to be conducted under responsible charge of one or more of these professionals.

The Executive Officer is authorized to name adjacent landowners or operators as Dischargers, and amend this Order naming them, if the adjacent land owners fail to provide Molycorp with full property access to allow off site investigation and routine monitoring work to proceed.

Failure to comply with the terms or conditions of this Order will result in additional enforcement action that may include the imposition of administrative civil liability and/or referral to the Attorney General of the State of California for such legal action as he or she may deem appropriate.

Ordered by:_____ Dated: _____

HAROLD J. SINGER
EXECUTIVE OFFICER

Attachment:Table 1

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Table 1
New Ivanpah Disposal Ponds
[Concentration for non-radiological and radiological parameters are in milligrams/liter and picocuries/liter, respectively][2]

Parameters	Water Quality Objectives[3]			Maximum Concentrations in Ground Water Plume[4]	
	Background Objectives Ground Water Zone 1 Well ME-4	Background Objectives Ground Water Zone 2 Well ME-5	Upper Objectives[5]	Ground Water Zone 1 Well MW-3 (unless otherwise noted)	Ground Water Zone 2 Well ME-2 (unless otherwise noted)
Total Dissolved Solids (TDS)	3,310	18,700	500	22,600	48,100
Strontium	7.0	17.1	4.2	8.1	30.0
Nitrate as N	2.10	2.5	10	240	20
Barium	0.13[6]	No Data	1	0.05	0.173
Gross Alpha	5	76	15	269[7]	779
Gross Beta	34	136	50	226[8]	1040
Uranium	3.5	0.4	20	92	406
Radium	42.6	2.5	5	2.2	10.8

[2] Radionuclide data is from a limited data set and may not be statistically representative of water quality conditions.
[3] Unless noted otherwise, background objectives were obtained from Molycorp Ground Water Monitoring Report, Second Quarter 1997, dated August 8, 1997
[4] Unless noted otherwise results were obtained from Molycorp Ground Water Monitoring Report, Fourth Quarter 1997, dated January 15, 1998
[5] All objectives are the Primary Maximum Contaminant Level (MCL), with the exception of the objectives for TDS and Strontium.The objective listed for TDS is the Secondary MCL.The objective for Strontium is the US Environmental Protection Agency (USEPA) Lifetime Health Advisory,which isbased on data published in the USEPA's Integrated Risk Information System (IRIS) for waters used in domestic supply systems.
[6] Molycorp Ground Water Monitoring Report, First Quarter 1997, dated June 2, 1997
[7] Well MW-4
[8] Well MW-2